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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,080	11/30/2001	Jerome J. Cuomo	297/105/2	4519

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JENKINS & WILSON, PA  
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 DURHAM, NC 27707

EXAMINER

NHU, DAVID

ART UNIT PAPER NUMBER

2818

DATE MAILED: 10/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/998,080

Applicant(s)

CUOMO ET AL.

Examiner

David Nhu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-67 is/are pending in the application.
- 4a) Of the above claim(s) 15,25-31 and 48-55 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16-24, 32-47, 57-67 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.


**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 60/250,297.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: 

## DETAILED ACTION

### *Election/Restrictions*

1. *Applicant's election of Group I ( Claims 1-14, 16-24, 32-47, 57-67) in page No.12 is acknowledge. Claims 1-14, 16-24, 32-47, 57-67 are remained for examination. Accordingly, claims 48-56 are withdrawn from consideration. See 37 CFR 1.142(b) and MPEP § 821.03.*

### **Claim Rejections - 35 USC § 103**

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-14, 16-24, 32-47, 57-67 are rejected under U.S.C 103(a) as being unpatentable over Kryliouk et al (6,218,280 B1) in view of Kim et al (5,270,263), and Background of Invention (BOI).

**Regarding claim 1**, Kryliouk, figures 1-6, and related text on col. 1-18, (figures 1A-1B), disclose a method for producing a bulk single crystal  $M'''N$  article comprising the steps of: providing a template material having an epitaxial growth surface; combining the Group III metal source vapor with an nitrogen containing gas to produce a reactant vapor species comprising Group III metal and nitrogen; depositing the reactant vapor species on the growth surface to produce a single-crystal  $M'''N$  layer thereon having a thickness of greater than approximately 10 microns (10000 Å).

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Kryliouk fails to teach the step of sputtering a group III metal target in a plasma-enhanced environment to produce a group III metal source vapor.

However, Kim, figures 1-6, and related text on col. 1-8, (figures 2, 3, 6A-6G, vol. 5, lines 60-67, col. 6, lines 1-67), teach the step of sputtering a group III metal target in a plasma-enhanced environment to produce a group III metal source vapor.

Regarding claims 2-14, 16-24, 37-39, 57-61, see Kryliouk, col. 1-18, Kim, col. 1-8, BOI, pages 1-6.

It would have been obvious to one having ordinary skill in the art at the time of the present invention to apply the teachings of Kim and BOI into the method of Kryliouk as both are related to the same subject matter of producing large area single crystalline III-IV nitride compound semiconductor substrate having sputtering metal target with nitrogen containing plasma in a plasma enhanced chemical vapor deposition (PECVD).

**Regarding claim 40**, Kryliouk, figures 1-6, and related text on col. 1-18, (figures 1A-1B), disclose a method for producing a single-crystal  $M^{III}N$  article comprising the steps of: providing a template material having an epitaxial growth surface; combining the Group III metal source vapor with an nitrogen containing gas to produce a reactant vapor species comprising Group III metal and nitrogen; and depositing the reactant vapor species on the growth surface to produce a single-crystal  $M^{III}N$  layer thereon.

Kryliouk fails to teach the step of using a sputter apparatus comprising a non-thermionic electron/plasma injector assembly to produce a Group III metal source vapor from a Group III metal target.

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However, Kim, figures 1-6, and related text on col. 1-8, (figures 2, 3, 6A-6G, vol. 5, lines 60-67, col. 6, lines 1-67), teach using a sputter apparatus comprising a non-thermionic electron/plasma injector assembly to produce a Group III metal source vapor from a Group III metal target.

Regarding claims 41-47, 66-67, see Kryliouk, col. 1-18, Kim, col. 1-8, BOI, Pages 1-6.

It would have been obvious to one having ordinary skill in the art at the time of the present invention to apply the teachings of Kim and BOI into the method of Kryliouk as both are related to the same subject matter of producing large area single crystalline III-IV nitride compound semiconductor substrate having sputtering metal target with nitrogen containing plasma in a plasma enhanced chemical vapor deposition (PECVD).

**Regarding claim 62**, Kryliouk, figures 1-6, and related text on col. 1-18, (figures 1A-1B), disclose a method for producing a bulk single crystal  $M^{\text{III}}N$  article comprising the steps of: providing a template material having an epitaxial growth surface; combining the Group III metal source vapor with an nitrogen containing gas to produce a reactant vapor species comprising Group III metal and nitrogen; depositing the reactant vapor species on the growth surface to produce a single-crystal  $M^{\text{III}}N$  layer thereon; and using the single crystal  $M^{\text{III}}N$  layer as a seed crystal to grow a bulk  $M^{\text{III}}N$  layer by depositing additional reactant vapor species comprising a Group III metal and nitrogen on the seed crystal.

Kryliouk fails to teach the step of sputtering a group III metal target in a plasma-enhanced environment to produce a group III metal source vapor.

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However, Kim, figures 1-6, and related text on col. 1-8, (figures 2, 3, 6A-6G, vol. 5, lines 60-67, col. 6, lines 1-67), teach the step of sputtering a group III metal target in a plasma-enhanced environment to produce a group III metal source vapor.

Regarding claims 32-36, 63-65, see Kryliouk, col. 1-18, Kim, col. 1-8, BOI, pages 1-6.

It would have been obvious to one having ordinary skill in the art at the time of the present invention to apply the teachings of Kim and BOI into the method of Kryliouk as both are related to the same subject matter of producing large area single crystalline III-IV nitride compound semiconductor substrate having sputtering metal target with nitrogen containing plasma in a plasma enhanced chemical vapor deposition (PECVD).

### **Conclusion**

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Kryliouk'666 is cited as of interest.

5. A shortened statutory period for response to this action is set to expired 3 (three) months and 0 (zero) day from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see 710.02 (b)).

6. Any inquiry concerning this communication on earlier communications from the examiner should be directed to David Nhu, (703) 306- 5796. The examiner can normally be reached on Monday-Friday from 7:30 AM to 5:00 PM. The examiner's supervisor, David Nelms can be reached on (703) 308-4910.

*The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.*

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*Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.*

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David Nhu 



September 1st, 2003